

We claim:

1. A Hall-current ion source apparatus comprising:
 - a discharge region;
 - means for supplying a flow of ionizable gas to said region;
 - 5 an electron-emitting cathode at or near one end of said region;
 - an anode within said region whereon said anode has an electron-collecting surface;
 - 10 a magnetic-field within said region and located between said surface and said cathode;
 - discharge means to generate ions from said gas and accelerate said ions out of said region;
 - 15 characterized by said electron-collecting surface being contoured so as to increase the area of said surface by approximately one-half.
2. A Hall-current ion source apparatus comprising:
 - a discharge region;
 - one or more apertures within said region;
 - means for supplying a flow of ionizable gas to said 5 region through said one or more apertures;
 - an electron-emitting cathode at or near one end of said region;
 - an anode within said region whereon said anode has an electron-collecting surface;
 - 10 a magnetic-field within said region and located between said anode and said cathode;

discharge means to generate ions from said gas and accelerate said ions out of said region;

characterized by said electron-collecting surface being 15 contoured, wherein approximately one-third or more of the area of said electron-collecting surface cannot be reached by straight lines originating from a given point exterior of said ion source.

3. A Hall-current ion source apparatus comprising:

a discharge region;

one or more apertures proximate to said region;

means for supplying a flow of ionizable gas to said 5 region through said one or more apertures;

an electron-emitting cathode at or near one end of said region;

an anode within said region whereon said anode has an 10 electron-collecting surface with said surface located between said apertures and said one end;

a magnetic-field within said region and located between said anode and said cathode;

discharge means to generate ions from said gas and accelerate said ions out of said region;

15 characterized by said electron-collecting surface being contoured, wherein approximately one-third or more of the area of said electron-collecting surface cannot be reached by straight lines originating from a given point exterior of said ion source.

4. A Hall-current ion source apparatus comprising:

- a discharge region;
- an anode within said region whereon said anode has an electron-collecting surface;
- 5 an electron-emitting cathode at or near one end of said region;
- a magnetic-field within said region and located between said anode and said cathode;
- means for supplying a flow of ionizable gas to said 10 region;
- discharge means to generate ions from said gas and accelerate said ions out of said region;
- characterized by a baffle means electrically isolated from said anode, wherein said baffle means is configured so 15 that approximately one-third or more of the area of said electron-collecting surface cannot be reached by straight lines originating from a given point exterior of said ion source.
5. An ion source as defined in Claim 1, further characterized by a baffle means electrically isolated from said anode, wherein said baffle means is configured so that approximately one-third or more of the area of said electron- 5 collecting surface cannot be reached by straight lines originating from a given point exterior of said ion source.
6. A method for making a Hall-current ion source including:
- providing a discharge region;

providing a means for supplying a flow of ionizable gas
5 to said region;

providing an electron-emitting cathode at or near one end
of said region;

providing an anode within said region with said anode
having an electron-collecting surface thereon;

10 providing a magnetic-field within said region and located
between said anode and said cathode;

providing a discharge means to generate ions from said
gas and accelerate said ions out of said region; and

15 providing contours in said electron-collecting surface
wherein said contours increase the area of said surface by
approximately one-half or more.

7. A method for making a Hall-current ion source
including:

providing a discharge region;

providing a means for supplying a flow of ionizable gas
5 to said region;

providing an electron-emitting cathode at or near one end
of said region;

providing an anode within said region with said anode
having an electron-collecting surface thereon;

10 providing a magnetic-field within said region and located
between said anode and said cathode;

providing a discharge means to generate ions from said
gas and accelerate said ions out of said region; and

contouring said electron-collecting surface so that
15 approximately one-third or more of the area of said electron-
collecting surface cannot be reached by straight lines
originating from a given point exterior of said ion source.

8. A method for making a Hall-current ion source
including:

providing a discharge region;

providing one or more apertures proximate to said
5 discharge region;

providing a means for supplying a flow of ionizable gas
to said region through said one or more apertures;

providing an electron-emitting cathode at or near one end
of said region;

10 providing an anode within said region with said anode
having an electron-collecting surface thereon;

locating said surface between said apertures and said one
end;

providing a magnetic-field within said region and located
15 between said anode and said cathode;

providing a discharge means to generate ions from said
gas and accelerate said ions out of said region; and

contouring said electron-collecting surface so that
approximately one-third or more of the area of said electron-
20 collecting surface cannot be reached by straight lines
originating from a given point exterior of said ion source.

9. A method for making a Hall-current ion source
including:

providing a discharge region;

providing an anode within said region with said anode
5 having an electron-collecting surface thereon;

providing an electron-emitting cathode at or near one end
of said region;

providing a magnetic-field within said region and located
between said anode and said cathode;

10 providing a means for supplying a flow of ionizable gas
to said region;

providing a discharge means to generate ions from said
gas and accelerate said ions out of said region;

providing a baffle means electrically isolated from said
15 anode; and

configuring said baffle means so that approximately one-third
or more of the surface area of said electron-collecting
surface cannot be reached by straight lines originating from
a given point exterior of said ion source.